Autodesk Feedback to MA DOER's whitepaper "An MPG Rating for Commercial Buildings"

Date: Feb 14, 2011

1. **Page 16: Technical Scale**

In order to calibrate the technical scale, we recommend the use of building information modeling (BIM). *Building information modeling (BIM) facilitates complex processes and analyses that were previously too laborious or expensive to perform. When BIM-based tools are used for energy modeling analysis, users benefit from reduced simulation times through automation, greater accuracy that results from the elimination of manual error-prone inputs, and greater consistency across different users.*

BIM-based energy modeling analysis differs from traditional energy modeling analysis in that it does not need to be manually recreated or modified, as much of the required data already exists in the architectural models created by the project design team. Information such as geometric data, construction types and the associated thermal properties, space loads, and other simulation parameters are automatically carried over from pre-existing BIM-based designs to the energy modeling analysis software. In addition to simplification of the process and cost-savings, BIM-based energy modeling analysis is also repeatable and transparent.[1]

In summary, BIM-based energy modeling analysis software offers an alternative approach to traditional energy modeling analysis software that reduces the need for human interpretation and translation through automation, resulting in reduced input errors and time and cost savings.

2. **Page 17: Multiple Building Categories**

The widely accepted ASHRAE building types would be a good standard to follow to assign categories for performance metrics

3. **Page 18: COMNET**

Again, we propose adding requirements to model using building information modeling for data normalization too.

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[1] GSA Building Information Modeling Series 05 - Energy Performance DRAFT, February 2009. U.S. General Services Administration. Available at: http://www.gsa.gov/portal/content/102283

BIM uses 3D computer-generated models to help architects, engineers and the construction industry to visualize and simulate the planning, design, construction and operation of a building with intelligent, data-rich, and object-oriented representations. Unlike conventional 2D CAD graphics, BIM delivers continuous and immediate feedback on the project design scope, schedule, and costing, which is high-quality, consistent, and reliable. BIM tools therefore improve coordination between the design and construction teams, resulting in reduced errors and omissions, shorter project delivery times, and cost savings.

The requirements for Complete Building Description described in COMNET's Commercial Buildings Energy Modeling Guidelines and Procedures, namely the Building Envelope and Space Descriptor, could be supplied by appropriately configured building information models. Further, these models can support input of information about thermal blocks, HVAC zones, and space functions. Employing the building information model to serve the Asset Rating Programs need for data normalization could streamline the process, increase the efficiency of the overall program and shrink the gap between design and analysis.

When used for sustainable building design, BIM has the potential to reduce costs by making the information required for sustainable design, analysis and certification routinely available, simply as a byproduct of the standard design process. In current practice, many 2D digital building models do not contain sufficient information for building performance analysis and evaluation – the building blocks of sustainable building design. Additionally, these models often require copious amounts of human intervention and interpretation, which are error-prone, data-redundant, and time consuming. Thus, BIM-based sustainable design can potentially reduce costs since they already contain much of the information needed for sustainable design, including daylighting and energy modeling analysis.[2]

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[2] "Building Information Modeling for Sustainable Design", an Autodesk white paper.
Available at: http://usa.autodesk.com/company/building-information-modeling/experience-bim
[3] GSA Building Information Modeling Series 05 - Energy Performance DRAFT, February 2009. U.S. General Services Administration. Available at: http://www.gsa.gov/portal/content/102283

4. **Page 20: ASHRAE Level 2 assessment for pre- and post-retrofit assessments**

ASHRAE Level 2 assessment doesn't mandate an energy model. We recommend augmenting ASHRAE Level 2 assessments with dynamic energy models using building information modeling.

5. **Page 20: Data collection**

Similarly, data collection using building information modeling will ensure the longevity, versatility, accessibility, availability and accuracy of data.

- The incorporation of rapid energy modeling into the pre-assessment phase would support improved verification and predictability.
- Also, increased awareness of the connection between building modeling and energy analysis should be incorporated into the assessor training program.

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6. **Page 22: Cost Control**

Cost is a major barrier to implementing energy efficiency measures, along with time and required expertise. Building owners can get information about the building's conditions through a variety of ways – from spreadsheets to drawings to pictures to laser point clouds. But they often have to pay insane amounts to auditors to get automatic boiler template reports or spend weeks or months pouring over plans, making sense of the data from a myriad of systems and conducting detailed energy modeling. Current methods of translating all that information into actionable results are expensive, laborious and inaccurate, and require high technical expertise. In short, they are un-scalable.

The status quo is clearly not enough. Building owners, developers, and property managers are desperately looking for scalable long term solutions to better measure, manage and forecast energy consumption and carbon emissions of their building portfolios; solutions that are quick, cost-effective, easy to understand and provide actionable conclusions based on building science, the building's geometry and accurate climate conditions.

To address these challenges, we recommend the addition of rapid energy modeling - a preliminary analysis step designed to increase efficiency. Rapid energy modeling entails the simplified simulation and building energy analysis of a schematic model of salient building characteristics. Early indication of asset rating performance enables program participants to prioritize cost-effective actions.

rapid energy modeling, a streamlined process that involves moving rapidly, and with minimal data, from existing building conditions, through simplified simulation to building energy analysis. Starting with as little as digital photos or satellite images, rapid energy modeling promises to deliver sophisticated analyses to help determine the asset rating, quickly and cost-effectively.